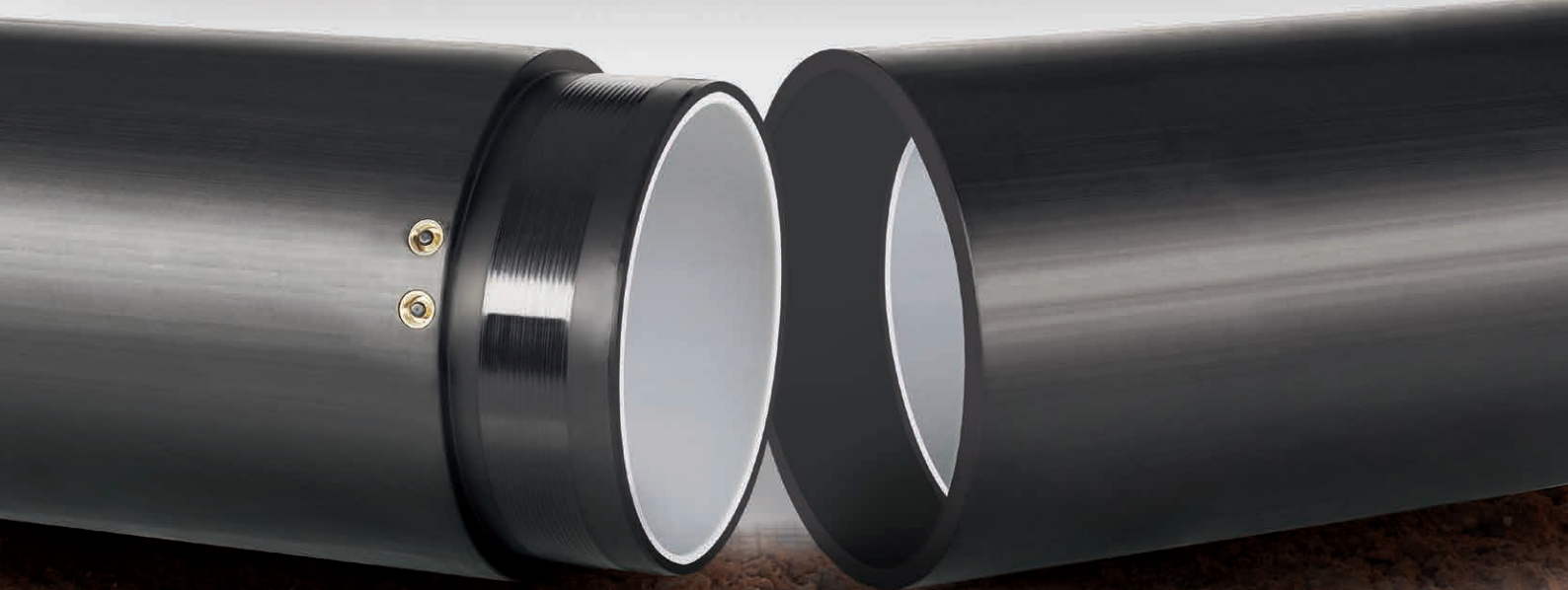


The SIMONA logo is located in the top right corner. It consists of the word "SIMONA" in a bold, white, sans-serif font, set against a solid red rectangular background.

SIMONA



SIMOFUSE®

Intelligent joining with integral electrofusion system

GLOBAL THERMOPLASTIC SOLUTIONS

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SIMOFUSE® – an innovation from SIMONA

SIMONA is a leading manufacturer and development partner for thermoplastic products. We offer best-in-class solutions for your applications in the chemical processing industry, water, energy and raw material supply sectors and mobility, environmental technology and construction industries worldwide.

For all areas of wastewater disposal, SIMONA offers innovative end-to-end piping systems made of high-quality thermoplastics for use in open trench or trenchless pipe rehabilitation or when laying new pipes. Our experts are available to support and advise you from the project development stage through to planning on site.



Efficient and space-saving

SIMOFUSE® joining technology is efficient and space-saving and can be implemented quickly on site even within shored trenches. Unlike electrofusion socket welding, there is no need to cut out socket recesses on the pipe support. The SIMOFUSE® system can be easily installed through the smooth-walled socket and spigot end on the already compacted pipe support.

High weld quality

Thanks to the complete integration of the filaments into the polyethylene, they are protected from damage in transit and during pipe installation. The larger weld zone combined with the precision fit and optimised welding parameters ensure a consistently high weld quality in accordance with DVS (German Welding Association) Procedure 2207.

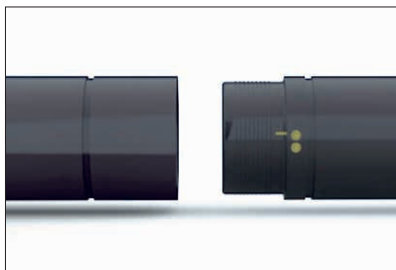
Approved for pressurised applications

With the continued development of SIMOFUSE® and approval of the joining technology for pressurised applications, solutions can also be implemented for buried pressure sewer systems and above-ground pressure mains. As an independent body, the State Materials Testing Institute Darmstadt (MPA) was responsible for external auditing of the material and therefore certifies that the products are fit for purpose on the basis of its assessments.

SIMOFUSE® – Intelligent joining with integral electrofusion system

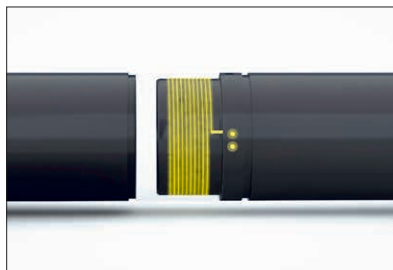
SIMOFUSE® combines the fast installation of a conventional socket connection with the integral bond achieved by electrofusion welding. SIMOFUSE® therefore brings together state-of-the-art welding techniques and compact design. The result is a wall-integrated weldable socket connection that does not require elastomer seals. The installation process is uncomplicated and space-saving: it takes just two steps to create an absolutely tight join – simply insert the pipe modules into one another and join them using standard welding equipment.

SIMOFUSE® joining technology: how it works



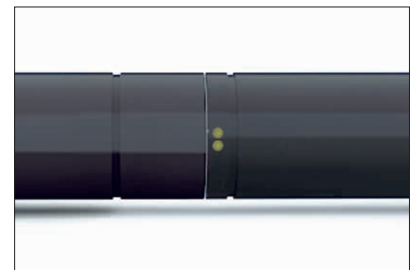
Simple push-in connection:

Pipe modules with factory-machined precision-fit socket and spigot end.



Weld immediately:

Uses standard commercially available 40 V welding equipment.



The result:

A tight welded joint with high tensile strength.

Benefits at a glance

- + Delivered “ready to install”
- + No weld bead inside or out
- + Improved efficiency during pipe installation
- + No root penetration thanks to integral, absolutely tight welded joint
- + Ideal for confined spaces and relining
- + Absolutely tight, axial-restraint pipe connection (also suitable for HDD – horizontal directional drilling – procedure)
- + No bulky socket structure
- + Independently tested and certified by MPA – Materials Testing Institute – Darmstadt



DIN

MPA
Darmstadt
CERT

SIMOFUSE® – time-saving and uncomplicated

Joining pipes and fittings in tight spaces is one of the biggest challenges when laying piping systems. SIMOFUSE® guarantees a simple, fast and cost-effective installation, especially in poorly accessible pipe sections.

Faster processing time

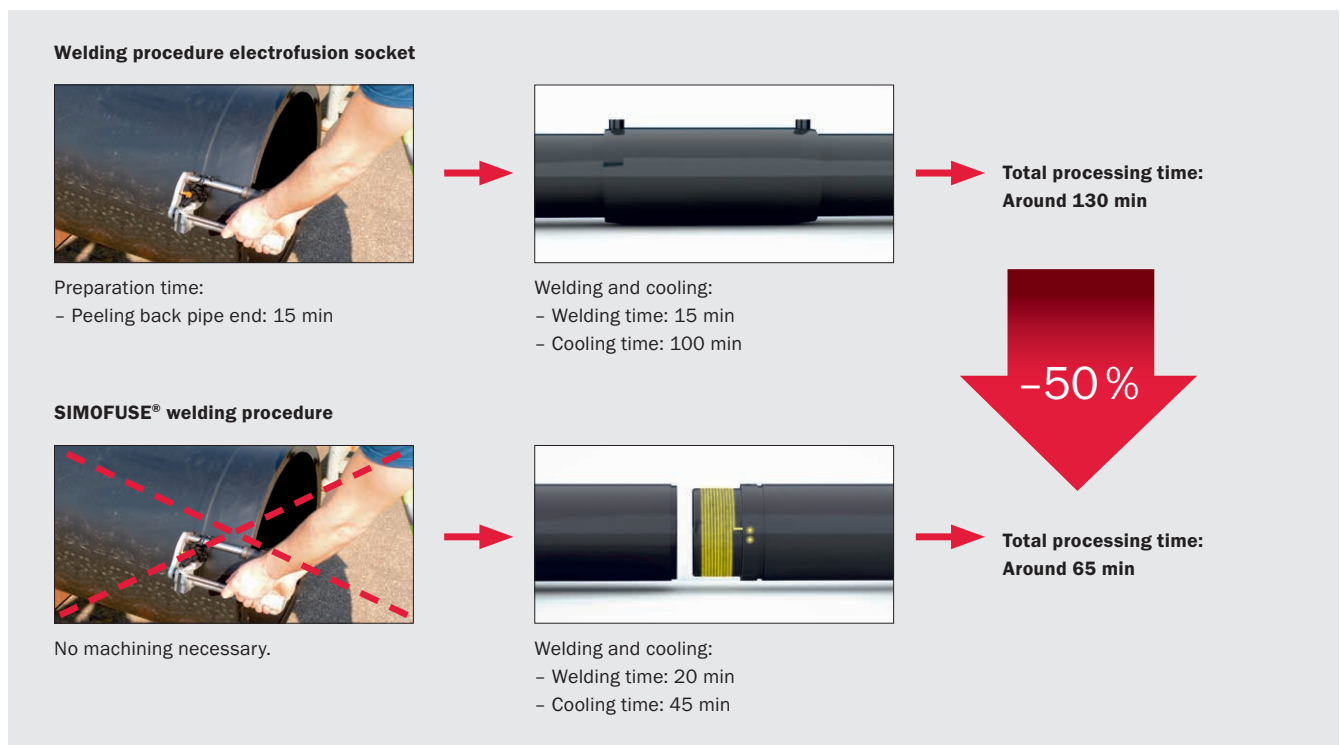
Pipe and connecting technology are supplied as one component. There is no need for time-consuming weld preparation like peeling back pipe ends. Recesses in the pipe support are no longer necessary because the socket connection does not protrude.

As there are fewer weld preparations and shorter heating up time, SIMOFUSE® can significantly reduce the overall processing time. SIMOFUSE® pipe modules are delivered to site ready to install. The joining technology therefore offers greater efficiency for laying piping systems and ensures absolute tightness and total protection from root ingress.



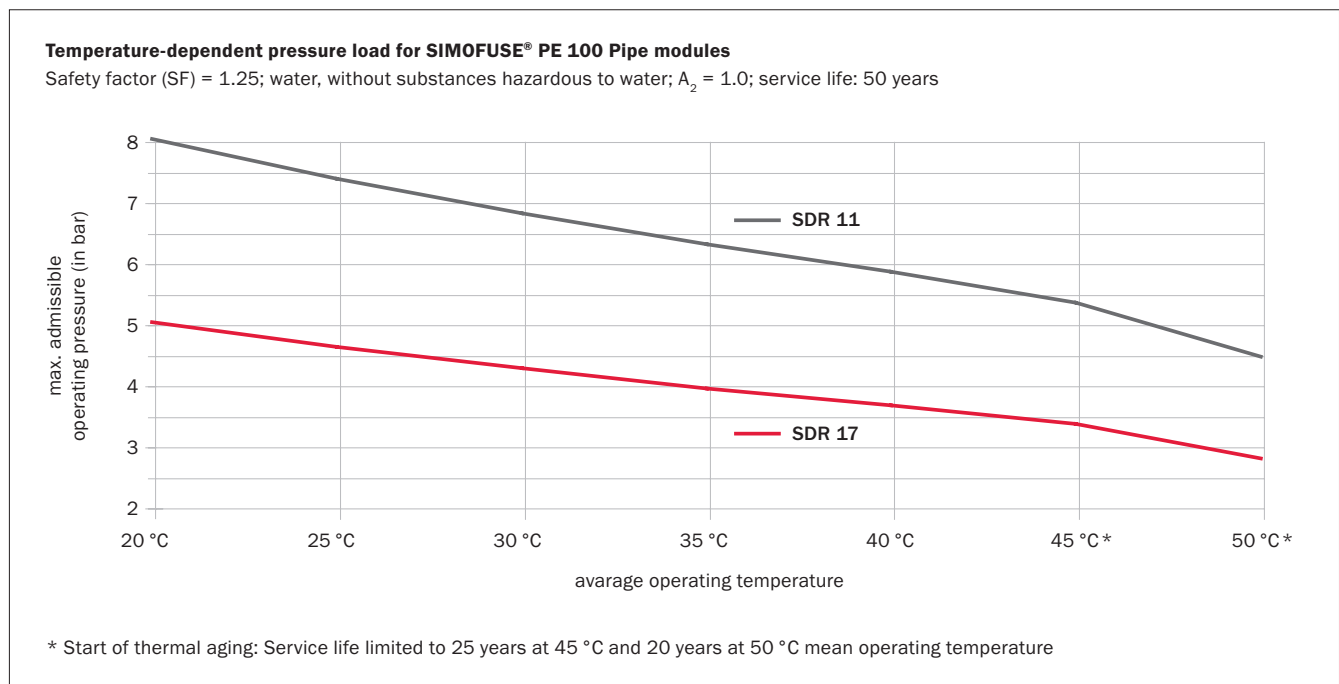
Welding is performed with a standard 40 V universal welder.

Comparison of welding duration for electrofusion socket and SIMOFUSE® for pipe modules d 560 mm, SDR 17.6



SIMOFUSE® – approved for pressurised applications by the State Materials Testing Institute Darmstadt

The requirements for pressurised pipes and connecting them are defined in DIN EN 12201*; a testing programme was developed based on this standard. As an independent body, the State Materials Testing Institute Darmstadt (MPA) was responsible for external auditing and therefore certifies that the products are fit for purpose according to its assessments. The maximum pressure level for the applications was approved on the basis of these extensive tests.



The scope of the testing programme is as follows:

- Type testing (TT)
- Audit testing (AT)
- Batch release testing (BRT)

The three main tests conducted in the programme are:

1. Shear and peeling tests to DVS (German Welding Society) Procedure 2203-6 BB1
2. Tensile creep test to DVS 2203-4 BB1
3. Internal pressure creep rupture test to DIN EN ISO 1167 1/2

These tests assess two key factors and provide information about the weld quality:

1. Pipe strength under internal pressure
2. Behaviour of welded joint under sustained loads

For SIMOFUSE® welded connections, type testing and batch release tests are generally carried out on the welded part.

In the process, the focus is not just on the function test of the entire part as such (test No. 3) but also on assessing the weld itself (tests No. 1 and 2).

The maximum pressure level for the applications was approved on the basis of extensive tests. SIMOFUSE® SDR 17 pipes withstand an operating pressure of 5 bar, while SDR 11 pipe modules can even be operated at 8 bar. In general, the temperature-dependent material behaviour has to be taken into account.

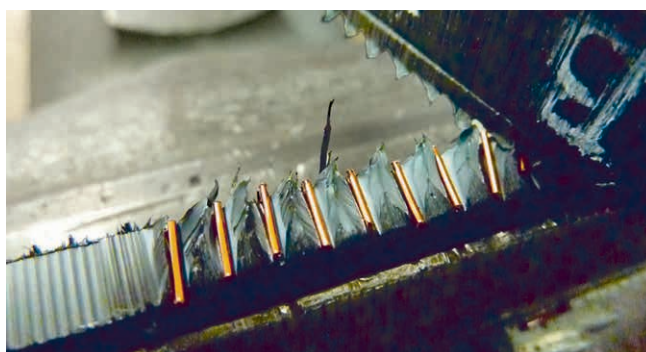
* [Plastic piping systems for water supply and for drainage and sewage pressure mains – polyethylene (PE)]

To be able to submit meaningful results, short-term and long-term destructive material testing has to be performed. The test procedures and assessment criteria are in accordance with the stipulations of the DVS regulation for welded connections in thermoplastic materials. A total of three fit-for-purpose tests were performed on SIMOFUSE® welded joints.

Overview of fit-for-purpose tests

1. Short-term test of weld by means of a shear and peel test to DVS 2203-6 BB1 with assessment of fracture surfaces in accordance with DVS 2203-1 BB4.

Objective: Ductile fracture patterns due to viscous material behaviour in weld characterised by plastic deformation (elongation).



Fracture pattern of a SIMOFUSE® weld sample in a torsion test.

2. Long-term testing of weld by means of creep rupture test to DVS 2203-4 BB1

Objective: Achieve minimum service life at 80 °C, alternatively 95 °C.

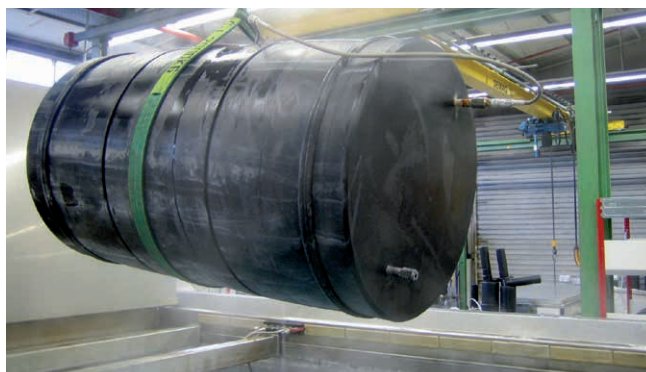


Sample following creep stress in weld zone.

3. Long-term test of entire part by means of internal pressure creep rupture test to DIN EN ISO 1167 with assessment of tightness.

Objective: Achieve minimum service life without breakage or leaks:

20 °C	100 h	12.0 MPA
80 °C	1,000 h	5.0 MPA
80 °C	165 h	5.4 MPA

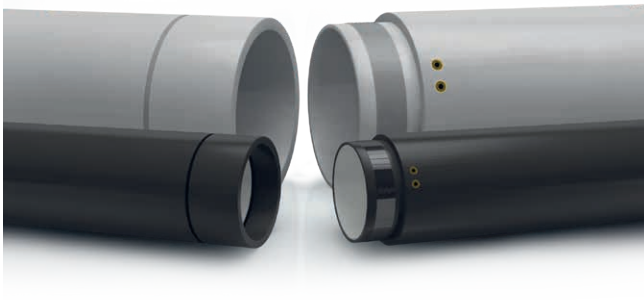


Specimen PE 100, d 710 mm, SDR 17 from SIMONA's own creep strength test rig.

SIMOFUSE® product range and fields of application

As well as plain black or grey PE pipe modules we also supply coextruded pipe modules with a light-coloured interior (PE CoEx) that are ideal for camera inspections. As a system vendor, SIMONA offers a range of other SIMOFUSE® piping components from a single source.

SIMONA® PE Pipe Modules SIMOFUSE®



SIMONA® PE Short and Long Pipe Modules SIMOFUSE®

SDR	Pipe diameter d mm	
	PE 100 black	PE 100 light grey
26	500 – 630	710 – 1.000
17/17.6	280 – 630	710 – 1.000
11	225 – 630	710

SIMONA® PE Pipe Modules SIMOFUSE® pressure

SDR	Pipe diameter d mm
17	400 – 710
11	225 – 710

d 225 mm to 630 mm: 0.7 m to 12 m module length
d 710 mm to 1,000 mm: 0.7 m to 6 m module length

SIMONA® PE Inspection Shaft SIMOFUSE®

The inspection shafts are custom-designed according to local conditions.



Example: Shaft with two inflow pipes and one outflow pipe; in- and outflows with light-coloured interior layers for improved inspection; deep shafts, in particular, are designed with a yellow high-visibility, anti-slip walk-on surface

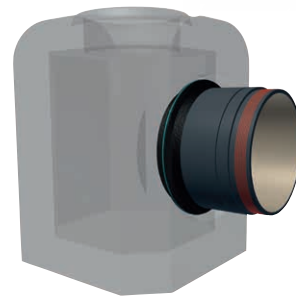


SIMONA® PE Shaft Connections SIMOFUSE®



Type A: Factory installation

Type B: In-situ installation
(construction site)



Type C: From d 710 mm

SDR	Pipe diameter d mm	Overall length l mm
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Typ A: Up to d 630 mm

26	280 – 630	135
17.6	160 – 630	135

Typ B: Up to d 630 mm

26/17.6	up to 630	Customised overall length
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Typ C: Up to d 630 mm

33/26/17/17.6	710 – 1,000	Customised overall length
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SIMONA® PE External Saddles SIMOFUSE®



SIMONA® PE External Saddles SIMOFUSE®

Pipe diameter d mm	Inlet connection DN
External saddle LF with integrated welding socket, type 1 (PE)	
200 – 560	150
External saddle with integrated plug-in socket, type 2 (PVC/PP)	
280 – 1,000	150
External saddle with integrated weld end, type 3 (PE/PVC/PP)	
280 – 1,000	150
External saddle for butt welding, type 4 (PE/PP)	
225 – 1,000	150 – 200

Areas of use:

SIMOFUSE® can be used in a wide range of applications:

Wastewater piping systems

- Backflow-proof sewage pipe systems up to 50/80 m water column
- Unpressurised sewage pipes with higher safety potential (e.g. in drinking water protection zones with acceptance test pressure 5 bar)
- Wastewater pump piping in sewage treatment plants
- Culvert pumping systems
- Wastewater pump pipes and ducts in industrial wastewater treatment plants
- Industrial cooling water piping in supply and return systems
- Sea water pump piping for desalination plants
- Suction and lifting pipes for groundwater lowering

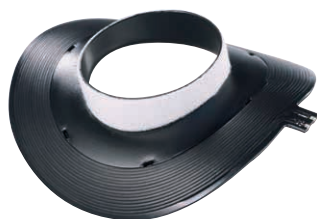
More efficient installation of assemblies

- Factory production of large fittings with SIMOFUSE® connection for faster installation on site

Double-containment piping

- Connecting media pipe and outer pipe in cascade welding sequence

SIMONA® PE Internal saddle SIMOFUSE®



SIMONA® PE Internal saddle SIMOFUSE®

Pipe diameter d mm	Inlet connection DN
280 – 355	150

Case studies – proven effective in confined installation spaces

SIMOFUSE® Pipes have demonstrated their advantages in practical use in site conditions for a wide range of construction projects.

Rehabilitation of a gravity sewer

In Aachen, the renewal of a section of an old sewage pipe focused in particular on cost efficiency and environmental compatibility. As the pipe ran through an inner city area, there was little room for the rehabilitation works. The client was looking for cost-effective and permanently tight piping systems that would also offer the option of renewing the pipeline with minimal disruption to the public.

The existing 900 mm diameter pipe was made of concrete. In view of the vulnerability of this material, the client decided to replace the existing discharge pipe with plastic pipes. The leaky sewage pipe was refurbished using d 800 mm, SDR 17 short pipe modules (custom-fabricated in overall lengths of 700 mm). The very short pipe modules were easily inserted and welded to the pipe section via the shaft structures. A total of 59 pipe modules were installed.



Short pipe modules 700 mm.

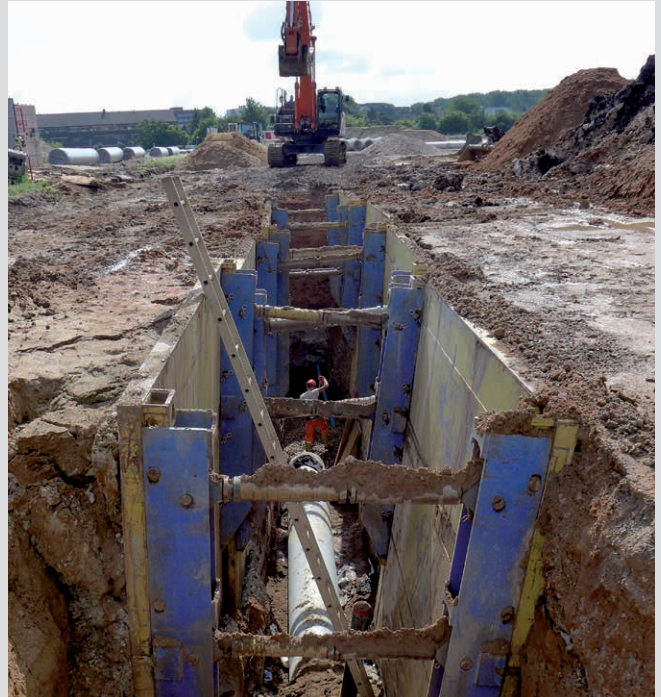


Insertion of pipe modules via the shaft.

Installation of new gravity sewer

As well as sewage from the Kirchberg Association of Local Authorities, the largest sewage treatment plant in Hunsrück also treats wastewater and effluent containing de-icer from Frankfurt Hahn Airport. After many years of investigations, planning measures and negotiations between the various parties involved and the water authorities, concepts to resolve the wastewater problem in the Association of Local Authorities ultimately resulted in the decision to build a new collective sewage treatment plant as the most ecological and economical solution for all participants.

One of the major challenges of this project was to ensure that the pipeline would not leak even underneath the aeration tank and secondary clarifier. In addition, the small trenches called for a space-saving technique and a pipe system that was easy to handle and move. Due to the connection to existing shaft structures, some pipe modules in custom lengths were prefabricated in the factory. This meant that they could be laid even faster and backfilled quickly.



Homogeneous SIMOFUSE® PE 100 light-grey pipe in a newly developed area of Euskirchen



Shaft assembly at Kyrbachtal sewage treatment plant by means of SIMOFUSE® integral electrofusion connection

Originally, the plan for the collective sewage treatment plant was to build a conventional concrete structure between the distribution structure and the aeration tank. At SIMONA's suggestion, however, the decision was taken in favour of a monolithic PE 100 shaft d 1,060 x 62.1 mm with an overall height of 8 m. A total of almost 6.5 km PE 80 CoEx SIMOFUSE® Pipes (d 400 x 22.7 mm; d 500 x 28.4 mm; d 630 x 35.7 mm) were laid. The CoEx pipes feature a light-coloured, inspection-friendly interior, making them ideal for camera inspections.



Installing the pipes in the shaft using integrated SIMOFUSE® weld connection.

Installation of new pressure pipes

In the Luxembourg town of Differdange, a plastic piping system that was easy to handle and above all pressure-resistant was needed for a wastewater pressure pipeline in an underground stream section with only a few points of access. As the pipeline was routed under connecting roads and rail tracks in permanent use, it was decided to lay the new pressure pipeline in the underground section of the adjacent river. Due to the poor accessibility of the stream section (reach lengths of up to 400 m) and the depth of the excavation trenches (more than 8 m), the plastic pipes had to meet special requirements.

This called for short pipe modules that allowed manual handling and could also be brought into the deep and narrow excavation trenches. As the pipe had to be installed in a narrow conduit, heated-tool butt welding or electrofusion socket welding could not be used. The goal was to weld the pipe sections simply and quickly without time-consuming preparations. The piping system had to be pressure-resistant to the maximum pressure occurring in the event of water hammer and capable of being combined with special pipe fittings. SIMOFUSE® pressure pipes d 500 x 29.7 mm with an overall length of 3,500 mm proved to be the ideal solution for installation in the hard-to-access deep trenches.



Lowering of SIMOFUSE® Pipe modules via the access structure.

Accessories and services from SIMONA

SIMONA is your trusted partner for equipment and accessories for processing and welding your piping systems. Our experienced team are happy to advise and support you with their extensive technical expertise.



Accessories for SIMOFUSE® welding

- Clamping tools
- Hydraulic equipment
- Welding equipment

Advisory service

Our customers benefit from bespoke solutions designed to help them succeed within their markets. SIMONA has extensive experience in the processing of sheets, pipes and fittings. You can always rely on our extensive knowledge and high level of technical expertise. The team from our Technical Service Centre will be happy to advise you.

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SIMONA Academy

At our Technology Centre and training facility in Kirn you can take part in product training workshops, learn about new processing techniques and practise them under supervision.

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Information service

Further information is available in the form of catalogues, brochures, case studies and project reports as well as DVDs, technical data sheets and product samples. Please contact our Marketing Department at:

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Delivery service

All our standard products are available from our central warehouses and distribution depots worldwide to provide you with a fast and flexible service. For more detailed information on sizes and availabilities, please contact our Sales Department:

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